

CHAPTER 16

MALIGNANT TUMORS OF THE JAWS

Squamous cell carcinoma

Metastatic carcinoma

Sarcomas

Leukemia

Multiple myeloma

Malignant lymphomas

Burkitt's lymphoma

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SQUAMOUS CELL CARCINOMA

Squamous cell carcinoma is a malignant tumor of epithelial origin. In the oral cavity, it arises from the oral mucosa. Most of the cases arise peripherally and some may invade the jaw bones, especially those that originate on or near the crest of the alveolar ridges and the posterior hard palate. In rare instances they may arise within the jaw bones (central type) from the epithelial cells of the dental lamina. Osseous involvement is seen most frequently in the mandibular third molar region. Carcinomas cause loosening or exfoliation of teeth. Squamous cell carcinoma spreads by direct extension into surrounding structures as well as by metastases through lymphatic channels. Thus, the lymph nodes involved in the metastatic spread of the lesion are enlarged, painless, very firm, immovable, and frequently matted together. These lymph nodes are in contrast to those of benign lymphadenitis (caused by infection) in which the nodes are enlarged, painful, firm, freely movable, and discrete.

On a radiograph, the erosion of the alveolar bone is seen as a radiolucent destructive lesion with ill-defined irregular margins. Radiographic appearances often simulate periodontal disease or periapical infection. The local destruction of bone produces the "teeth floating in space" appearance similar to that of histiocytosis X.

- Fig. 16-1 Squamous cell carcinoma producing destruction of bone around the left mandibular molar giving it a "tooth floating in space" appearance. Notice the diffuse and irregular borders of the lesion.
- Fig. 16-2A Squamous cell carcinoma shows bone destruction in the mandibular right molar region.
- Fig. 16-2B Close-up of illustration. Squamous cell carcinoma of the alveolar ridge and surrounding mandibular bone. Notice the diffuse and irregular borders of the lesion.
- Fig. 16-2C The same squamous cell carcinoma after extraction of all the teeth. The radiograph was taken one month later and shows extensive bone destruction.
- Fig. 16-3 Squamous cell carcinoma producing irregular bone resorption. The lesion also involved the oral soft tissues.
- Fig. 16-4 Squamous cell carcinoma of the oral mucosa invades the alveolar bone and produces diffuse destruction of bone mesial to the molar.

METASTATIC CARCINOMA

The secondary carcinoma in the jaws could have metastasized from any site in the body; the most common primary sites are breast, lung, kidney, prostate, colon, stomach and testis. Metastases to the jaws are rare and represent only 1% of all malignant tumors of the oral region. The mandible is more frequently affected than the maxilla, the premolar and the molar regions are most commonly involved. Usually the lesions are asymptomatic and are found on routine radiographic examination. If the mandibular nerve is involved, then the clinical signs may include pain, paresthesia or anesthesia of the lip or chin. The teeth in the region of the lesion may become loosened or exfoliated. Very often, at the time of oral examination, the patient may be unaware of the presence of the primary lesion. The radiographic appearance is similar to that of squamous cell carcinoma, that is, an ill-defined destructive radiolucent lesion which may perforate the cortical plate. Radiographic appearances often simulate periodontal disease or periapical infection.

Fig. 16-5 Metastatic carcinoma of the mandibular canine and premolar region in which the primary lesion was a carcinoma of the breast in a 70 year old female.

Fig. 16-6 Metastatic carcinoma. Destructive radiolucency with recent history of loose teeth caused by metastatic adenocarcinoma.

Fig. 16-7 Metastatic carcinoma. Primary lesion was in the breast.

SARCOMA

Sarcomas are malignant tumors of mesodermal origin and may originate in fibrous tissue, cartilage, bone, muscle, fat or endothelial tissue. Sarcomas usually have an abundant vascular supply and, therefore, metastasize via the blood stream. Carcinomas, on the other hand, metastasize via the lymphatics. Sarcomas occur in relatively younger persons than do carcinomas. The classification of sarcomas is according to the tissues from which they are derived. The more common sarcomas are: osteosarcoma, chondrosarcoma, fibrosarcoma and Ewing's sarcoma.

1. **OSTEOSARCOMA** (osteogenic sarcoma). It is a malignant tumor of bone. Although rare, osteosarcoma is the more common type of all the sarcomas. There are, in general, two types of osteosarcomas: an osteoblastic (sclerosing) and an osteolytic type. There are few differences in the clinical features of the two types. The osteolytic type often exhibits a rapid growth pattern and thus produces a bigger mass of bone destruction which is more susceptible to pathologic fracture.

The jaw lesion is more common in older males of mean age 33 years whereas lesions in other sites of the body occur in the younger age group of mean age 23 years. The mandible is more often involved than the maxilla. The long bones like the femur, tibia and humerus are most frequently affected. When the tumor occurs in the jaws, the chief complaint is the presence of a rapidly growing swelling and pain. The affected teeth may be loosened, displaced and paresthesia may develop. Osteosarcoma arises frequently in bones subjected to either trauma, therapeutic x-

radiation or Paget's disease. Osteosarcomas are prone to develop hematogenous metastases, mainly to the lungs.

The earliest radiographic sign is a widening of the periodontal ligament space or a radiolucency around one or more teeth. Later on, the lesion assumes an osteolytic radiolucent form, an osteoblastic radiopaque form or a mixed radiolucent image with radiopaque foci. The malignant nature of the disease gives it an irregular, ill-defined borders. There is expansion and destruction of the cortical plates. In one-third of the cases, thin spicules of new bone extend outwards away from the bone cortex, producing the characteristic sunray, sunburst or fan-shaped appearance.

2. **CHONDROSARCOMA.** It is a malignant tumor of cartilaginous tissue which predominantly occurs in adulthood and old age (third to fifth decade of life). Bones that arise from cartilaginous tissue are more liable to develop chondrosarcoma, therefore, a jaw lesion is rather rare. A jaw lesion has a poorer prognosis than those in other bones. In contrast to osteosarcoma, it rarely metastasizes and the extragnathic skeletal lesion has a better prognosis. Initially, the lesion occurs as a painless hard swelling of the bone which later produces extensive bone destruction. The teeth adjacent to the lesion may be resorbed, loosened, or exfoliated. Radiographic appearance of chondrosarcoma varies from moth-eaten radiolucencies that are solitary or multilocular to diffusely opaque lesions. Localized widening of the periodontal ligament space may also be observed. The borders of the lesion are poorly defined. In some cases, a sunray appearance may be seen.

3. **FIBROSARCOMA.** It is a malignant tumor of fibroblasts in which there is no deposition of osteoid or bone. Fibrosarcoma is more uncommon than osteosarcoma and chondrosarcoma. It may arise either in the jaw bones or in the soft tissues. The patient experiences pain, swelling, loosening of teeth and paresthesia. The tumor occurs in older patients (50 years) and in young children. As with osteosarcoma, fibrosarcoma is occasionally associated with Paget's disease or may result from therapeutic irradiation. The radiographic appearance may simulate the radiolucent form of osteosarcoma, and have ill-defined borders. The teeth may be displaced.
4. **EWING'S SARCOMA (Ewing's Tumor).** It is a malignant tumor of bone derived from mesenchymal connective tissue of the bone marrow. The lesion rarely occurs in the jaws, it is most common in the femur and tibia. It is a rapidly growing, highly invasive tumor with early and widespread metastasis. Pain and swelling are the most common manifestations. The radiographic appearance is that of an ill-defined destructive mottled radiolucent lesion which may be unilocular or multilocular. In the early stages, the mottled rarefaction may resemble an osteomyelitis. In later stages, it may stimulate the periosteum to produce thin layers of bone, resulting in an "onion skin" effect. Advanced cases may exhibit a sunburst appearance. The prognosis is very poor, most cases lead to death within a few years of diagnosis.

Fig. 16-8 Osteosarcoma of the osteolytic type involving the mandible.

Fig. 16-9 Recurrence of osteosarcoma on the right side after surgical treatment.
The lesion produces the characteristic sunray appearance.

Fig. 16-10 Osteosarcoma of the osteoblastic or sclerosing type in the maxilla.

Fig. 16-11 Osteosarcoma of the osteolytic type showing widening of periodontal
ligament space and an apical radiolucency involving the last molar.

LEUKEMIA

Leukemia is a malignant neoplastic disease of the bone marrow and peripheral blood. The disease is characterized by overproduction of white blood cells with replacement of the normal bone marrow, circulation of abnormal cells in the blood, and infiltration of other tissues. Leukemia accounts for 5% of all malignancies. In children, it is the single most common cause of cancer deaths. The acute and chronic forms can occur at any age, however, the acute form generally occurs in children whereas the chronic form generally occurs in adults. Clinical manifestations include fatigability, anemia, lymphadenopathy, hepatosplenomegaly, bone and abdominal pain, secondary infection, and hemorrhagic lesions secondary to thrombocytopenia. Failure of liver and spleen is due to infiltration by malignant cells. Oral lesions include gingival bleeding, mucosal ulceration, gingival enlargement, pain and periodontitis. Radiographic findings are those of periodontal disease, severe bone loss, loss of lamina dura and loosening of teeth. Local dental cause must be ruled out to make an interpretation of leukemia.

MULTIPLE MYELOMA

Multiple myeloma is a multicentric malignant neoplasm of plasm cells in the bone marrow and affects the entire skeleton, particularly the ribs, sternum, skull, clavicles, spinal column and jaws. It occurs mainly in the older age group. Pain in the bones is the most important symptom and is accompanied by weakness, fatigue and loss of weight. The bone destruction is liable to produce pathologic fractures when the jaws are involved. Jaw pain is followed by swelling, expansion of the jaws, numbness and mobility of teeth.

The typical radiographic appearance is that of numerous small well-defined radiolucencies, giving the characteristic "punched-out" appearance without a sclerotic border. Although not always present, cranial lesions are common. Sometimes there might be diffuse demineralization of various areas of the skeleton. Laboratory findings show progressive anemia, and increased serum gamma globulin which results in a reversal of the albumin/globulin ratio and increases the total serum protein level. Plasma cells are usually found in the peripheral blood and Bence Jones protein is found in the urine in at least half of the patients. Most patients suffering from multiple myeloma die within 2 to 3 years, therefore, treatment is mostly palliative.

Fig. 16-12 Multiple myeloma of the mandibular ramus and body showing widespread destruction of bone.

Fig. 16-13 Multiple myeloma seen as multiple radiolucent lesions in skull.

Fig. 16-14 On a postero-anterior skull radiograph, multiple myeloma is seen as multiple radiolucent lesions.

Fig. 16-15 Multiple myeloma in the ribs and humerus (Courtesy, Dr. A. Wuehrmann and Dr. L. Manson-Hing).

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MALIGNANT LYMPHOMAS

Malignant lymphomas are a group of immunologic neoplasms which arise in lymphoid tissue. The various types of lymphomas are Hodgkin's disease, lymphosarcoma, reticulum cell sarcoma and giant cell lymphoma. Depending on the type of lymphoma, some or all of the following clinical features may be exhibited: painless enlargement, fever, loss of weight, anemia, generalized weakness, and anorexia. All lymphomas, with the exception of Hodgkin's disease, affect middle and older age groups. On a radiograph, the radiolucencies are similar in appearance to periodontal abscesses. There is loss of lamina dura around the teeth. In advanced stages, large multilocular destructions are seen. To make a complete diagnosis of malignant lymphoma, clinical, radiographic, microscopic and laboratory information must be correlated.

BURKITT'S LYMPHOMA

Burkitt's Lymphoma is a characteristic form of non-Hodgkin's lymphoma that is endemic in Africa and occurs sporadically in North America. The Epstein-Barr virus has been implicated in the etiology. Burkitt's lymphoma is primarily a tumor of childhood, with occasional cases seen in young adults. Approximately 50% of the African cases occur in the jaws; abdominal involvement is the most common presentation for American Burkitt's lymphoma. The disease is more common in the maxilla than in the mandible. It occurs as a rapidly growing mass associated with bone destruction, loosening of teeth, and extension into adjacent soft tissues. Individuals who do not receive treatment are not likely to survive longer than 3 to 6 months. Remission occurs in 90% of patients who receive aggressive chemotherapy, but two-thirds of these who had advanced disease when the therapy was initiated will have relapse.

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